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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2026
Course Code:CSE317 , Course Title: Microprocessor and Microcontroller
Level:3 Term:1 Batch: 66

Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	A micro controller is used in a smart energy meter to process sensor data and control peripheral devices. Explain how the CPU architecture enables efficient execution of instructions and data processing in this application and which architecture suits the best.	[3]	CO2
	b)	i. Show the Pin modes of STM32 Micro-controller. ii. Illustrate the architecture of the STM32L4 ARM Cortex-M4 processor and Describe the functions of its major components.	[7]	
2.	a)	Compare UART and I2C communication protocols used in STM32 micro-controllers with respect to: • Number of communication lines • Communication type • Overall performance • Speed • Typical applications	[2.5]	CO2
	b)	Explain the function of each of the following components in the STM32 interrupt system: i. Nested Vector Interrupt Controller (NVIC) ii.Interrupt Service Routine (ISR) iii.Interrupt Vector Table Illustrate how these components work together when a push button generates an interrupt	[2.5]	

3.	a)	MOV AX,
		7FFFH ADD
		AX, 0001H
		MOV BL, F0H
		AND BL, 0FH
		INC AL
		MOV CL, 80H
		SUB AX, 8000H
		XOR BL, BL
		Identify the status of the flags after each instruction that modifies them
			[5]	CO3

	b)	i.Two strings of equal length (10 characters each) are stored at memory. Write an assembly language program to compare the two strings character by character. Count the number of matching character	[3+3]	

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		ii.A string of 20 characters is stored at a register Write an 8086 assembly program to replace every occurrence of 'A' with '@' and every occurrence of 'E' with '#'. Store the modified string	[4]	

	c)	MOV AX, 1111H
		MOV BX, 2222H
		MOV CX, 3333H
		MOV DX, 4444H
		
		PUSH AX
		PUSH BX
		PUSH CX
		
		POP SI
		ADD SI, DX
		
		POP DI
		
		PUSH SI
		
		POP BX
		
		POP AX
		
		SUB BX, AX
		iFind the Final values of AX, BX, CX, DX, and SP.
		iiDraw the stack after every PUSH and POP instruction		

4	a)	You're implementing a basic encryption system where each byte is rotated 3 bits to the right to obfuscate it. Task: Given AL = 11011010b Analyze the following tasks a. Write the instruction(s) to rotate the byte right by 3 bits.. Determine the resulting binary value of AL after the rotation. b. Using the rotated value obtained in part (a), extract the resulting lower nibble as the final value in AL. c. Write the instruction(s) that make all bits of AL identical to the original Most Significant Bit (MSB). d. Determine whether Bit 6 and Bit 0 are both active (1) at the same time e. Explain how the original byte can be recovered. All these task should be done using appropriate logic,shift,rotation and necessary sequences of assembly codes.	[10]	CO4